

RINGKASAN

Jagung manis (*Zea mays* L. *saccharata* Sturt) merupakan salah satu komoditas penting dan banyak diminati oleh konsumen. Budidaya jagung manis dapat dilakukan di lahan kering yaitu pada tanah ultisol. Namun, tanah tersebut memiliki kandungan unsur hara dan bahan organik tanah yang rendah sehingga produktivitas tanah ultisol mengalami penurunan. Bahan organik perlu ditambahkan pada tanah ultisol melalui pupuk organik. Salah satu potensi untuk dijadikan pupuk organik yaitu kasgot yang diperkaya kandungan unsur C dan N. Kasgot merupakan residu dari biokonversi sampah organik oleh *Black Soldier Fly*/BSF. Namun, masih terdapat beberapa parameter yang belum memenuhi standar mutu Keputusan Menteri Pertanian RI (Kepmentan RI) No. 261/KPTS/SR.310/M/4/2019 tentang Persyaratan Teknis Minimal Pupuk Organik, Pupuk Hayati, dan Pembenah Tanah. Mutu kasgot bisa ditingkatkan dengan memberikan bahan tambahan berupa biochar (arang sekam), zeolit, legum, EM4 dan molase. Penelitian ini bertujuan untuk (1) mengetahui formulasi kasgot yang berpengaruh paling baik terhadap fisiologis tanaman jagung manis di tanah ultisol (2) mengetahui pengaruh aplikasi kasgot yang diperkaya biochar, legum dan zeolit terhadap respon fisiologis tanaman jagung manis di tanah ultisol.

Penelitian dilaksanakan di Laboratorium Kebun Percobaan, Laboratorium Agronomi dan Hortikultura, Laboratorium Tanah dan Sumberdaya Lahan yang terletak di Fakultas Pertanian, Universitas Jenderal Soedirman serta analisis pupuk kasgot dan analisis tanah di Laboratorium BPSIP Pertanian di Semarang, Jawa Tengah. Kegiatan penelitian dilaksanakan pada bulan September 2023-April 2024. Penelitian ini menggunakan Rancangan Acak Kelompok (RAK) non faktorial dan 4 ulangan. Perlakuan formula kasgot yang digunakan meliputi K0 = Kontrol negatif (tanpa pemberian pupuk NPK), K1 = Kontrol positif (dengan pemberian pupuk NPK), K2 = Kasgot 100% , K3 = Kasgot 88% + Biochar 5% + Legum 2% + Zeolit 5%, K4 = Kasgot 76% + Biochar 10% + Legum 4% + Zeolit 10%, K5 = Kasgot 64% + Biochar 15% + Legum 6% + Zeolit 15% dan K6 = Kasgot 52% + Biochar 20% + Legum 8% + Zeolit 20%. Variabel yang diamati yaitu luas daun (cm^2), kehijauan daun (unit), lebar bukaan stomata (μm) dan kerapatan stomata (unit/mm^2), bobot tanaman kering (g), laju pertumbuhan relatif (g/minggu), laju asimilasi bersih ($\text{g}/\text{dm}^2/\text{minggu}$), bobot daun khas (g/dm^2), rasio tajuk akar, serapan P ($\text{mg}/\text{tanaman}$) dan panjang akar total (cm). Data hasil penelitian dianalisis menggunakan uji ANOVA pada taraf kesalahan 5%, jika menunjukkan pengaruh nyata maka dilanjutkan uji *Duncan's Multiple Range Test* (DMRT) pada taraf kesalahan 5%.

Hasil analisis kandungan unsur hara kasgot menunjukkan unsur makro dan mikro telah memenuhi standar Kepmentan RI No. 261/KPTS/SR.310/M/4/2019. Hasil penelitian menunjukkan bahwa kasgot yang diperkaya biochar, legum dan zeolit berpengaruh terhadap panjang akar total, kehijauan daun, luas daun, bobot tanaman kering, rasio tajuk akar dan serapan P. Pemberian kasgot 88% yang ditambah dengan biochar 5%, legum 2% dan zeolit 5% berpengaruh paling baik terhadap fisiologis tanaman jagung manis di tanah ultisol.

SUMMARY

Sweet corn (*Zea mays L. saccharata Sturt*) is one of the important commodities and is in great demand by consumers. Sweet corn cultivation can be done on dry land, namely on ultisol soils. However, the soil has a low content of nutrients and soil organic matter so that the productivity of ultisol soil has decreased. Organic matter needs to be added to ultisol soil through organic fertilizer. One of the potentials to be used as organic fertilizer is maggot frass which is enriched in C and N. Maggot frass is a residue from the bioconversion of organic waste by Black Soldier Fly (BSF) larvae. However, there are still several parameters that do not meet the quality standards of the Decree of the Indonesian Minister of Agriculture (Kepmentan RI) No. 261/KPTS/SR.310/M/4/2019 concerning Minimum Technical Requirements for Organic Fertilizers, Biofertilizers, and Soil Improvers. The quality of maggot frass can be improved by providing additional ingredients in the form of biochar (husk charcoal), zeolite, legumes, EM4 and molasses. This study aims to (1) determine the formulation of maggot frass which has the best effect on the physiology of sweet corn plants in ultisol soil (2) determine the effect of maggot frass application enriched with biochar, legumes and zeolites on the physiological response of sweet corn plants in ultisol soil.

The research was conducted at the Experimental Garden Laboratory, Agronomy and Horticulture Laboratory, Soil and Land Resources Laboratory located at the Faculty of Agriculture, Jenderal Soedirman University and analysis of maggot frass fertilizer and soil analysis at the BPSIP Agriculture Laboratory in Semarang, Central Java. Research activities were carried out in September 2023-April 2024. This study used a non-factorial Randomized Group Design (RAK) and 4 replications. The maggot frass formula treatments used include K0 = Negative control (without NPK fertilizer), K1 = Positive control (with NPK fertilizer), K2 = 100% Maggot Frass, K3 = 88% Maggot Frass + Biochar 5% + Legume 2% + Zeolit 5%, K4 = 76% Maggot Frass + Biochar 10% + Legume 4% + Zeolit 10%, K5 = 64% Maggot Frass + Biochar 15% + Legume 6% + Zeolit 15% and K6 = 52% Maggot Frass + Biochar 20% + Legume 8% + Zeolit 20%. The variables observed were leaf area (cm²), leaf greenness (unit), stomatal aperture width (μm) and stomatal density (unit/mm²), dry plant weight (g), relative growth rate (g/week), net assimilation rate (g/dm²/week), typical leaf weight (g/dm²), root crown ratio, P uptake (mg/plant) and total root length (cm). Data from the study were analyzed using ANOVA test at 5% error level, if it showed a real effect, it was followed by Duncan's Multiple Range Test (DMRT) test at 5% error level.

The results of the analysis of the nutrient content of maggot frass showed that the macro and micro elements had met the standards of the Indonesian Minister of Agriculture Decree No. 261/KPTS/SR.310/M/4/2019. The results showed that biochar-enriched cassava, legumes and zeolite had an effect on total root length, leaf greenness, leaf area, dry plant weight, root crown ratio and P uptake. The application of 88% maggot frass supplemented with 5% biochar, 2% legumes and 5% zeolite, had the best effect on the physiology of sweet corn plants in ultisol soil.